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DISEASES OF THE NERVOUS SYSTEM

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

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CONTENTS:

OUT PATIENT TREATMENT WITH FARADIC (NON-CONVULSIVE ELECTRIC) STIMULATION 323
Nathaniel J. Berkowitz

NEUROBIOLOGIC RESEARCH IN PSYCHIATRY 333
Leo Alexander

PARADOXICAL TEARS—TEARS OF HAPPINESS 337
Edmund Bergler

AUTO ELABORATION: AN ADJUVANT TECHNIQUE IN THE PRACTICE OF PSYCHOTHERAPY 339
Emanuel Messinger

NEUROLOGICAL CLINICAL PATHOLOGICAL CONFERENCE OF THE CINCINNATI GENERAL HOSPITAL 345

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DISEASES of the NERVOUS SYSTEM

A PRACTICAL JOURNAL ON PSYCHIATRY AND NEUROLOGY

Out-Patient Treatment With Faradic (Non-Convulsive Electric) Stimulation

NATHANIEL J. BERKWITZ, M.D.
Minneapolis, Minn.

Early in 1939 the writer started an investigation to find a safe substitute for pharmacologic convulsive therapies which were so popular at that time.[1] The problem was to find an effective substitute eliminating the undesirable features and dangerous complications so frequently encountered with pharmacologic convulsive treatment. This investigation led to the development of a procedure using faradic stimulation combined with an intravenous barbiturate as adjuvants to psychotherapy. This approach was developed from observations made[2] that two main phenomena took place in the various pharmacologic shock treatments, namely, "(1) physiologic stimulation followed by (2) depression or temporary inhibition of the higher cerebral centers," or sedation. Several years later, Kalinowsky and Hoch[3] came to similar conclusions remarking in the final paragraph of their monograph on "Shock Treatment," "Shock treatment is an unspecific form of treatment, acting as a special form of sedation and stimulation on certain types of abnormal mental activity."

It was only after I had treated the first few patients with non-convulsive stimulation that I learned of the early work of Cerletti and Bini[4] being carried on in Italy at that time. Their objective also was to find a substitute for metrazol convulsive treatment. However, they used an alternating electric current strong enough to shock patients into convulsive seizures and unconsciousness as a physical substitute.

Although encouraging results were obtained with non-convulsive faradic stimulation combined with intravenous barbiturates,[5] this method was not widely accepted and electric convulsive therapy became the treatment of choice. Many workers including Bennett,[6] Kalinowsky,[7] and Diethelm,[8] denounced the use of non-convulsive electric shock therapy claiming that it not only terrified the patient, but it also was ineffective. However, none of these writers had mentioned using intravenous barbiturate sedation with electric non-convulsive stimulation. As time passed, many disadvantages and limitations as well as advantages of electric convulsive therapy became better known and the need for further improved methods became more and more apparent.

In 1949, Hirschfeld[9] reported his experience with a form of non-convulsive electrostimulation given with intravenous pentothal sodium. He was not informed of the writer's previous work when his first paper was presented. These two methods of treatment are not identical and their differences will be discussed later in this paper. Other types of non-convulsive stimulation therapy have been described by Jacobson[10] and Milligan.[11] To avoid confusion with these other forms of shock therapies, the term F.S.S.P. (fara-

Read at the eighth annual meeting of the Electroshock Research Association, Atlantic City, New Jersey, May 10, 1952.

From the Department of Psychiatry and Neurology, University of Minnesota.

dic stimulation-sedation-psychotherapy) will be used from hereon in this paper.

For obvious reasons, it is unreasonable to expect that any form of shock treatment alters the basic personality of an individual. The most that can be expected with any type of shock therapy is to help relieve the patient of his unpleasant psychotic material or recently acquired mental aberrations. Shock treatment is a symptomatic remedy, and not a "cure" for mental illness. E.C.T. has proven to be of considerable value in some psychiatric conditions, particularly in severe depressions with pronounced agitation, and in certain types of schizophrenia. Its use, however, is contra-indicated in the treatment of psychoneuroses and psychosomatic conditions according to the "Committee on Therapy."[12] Linn and Rosen[13] observed that "psychoneurotics, particularly obsessives, phobias, or hysterias are made worse" with Liberson's "brief stimuli" therapy. Kalinowsky likewise stated that, "Psychoneurotics may even be harmed with electro-convulsive therapy."

The writer has found that the administration of psychotherapy is greatly facilitated with the use of F.S.S.P. in the treatment of simple depression, anxiety states, conversion hysteria, mild obsessive-compulsive states, somatization reactions, and some ambulatory cases of schizophrenia. It was found that this type of treatment facilitates abreaction, promotes elevation of the patient's mood, and helps to demonstrate to the patient, as soon as prompt relief is received, that his symptoms are largely of emotional origin and can be reversed with further therapy. Since no amnesia, confusion, or loss of consciousness occur in this treatment it is possible to conduct psychotherapy concurrently and adequately. As F.S.S.P. is simple and safe, the usual safeguards and precautions recommended for E.C.T. are not required. However, it must be emphasized that only a qualified psychiatrist should administer this treatment so that proper psychotherapy is given.

Only ambulatory cases treated by F.S.S.P. will be discussed in this paper. Over 403 non-hospitalized patients with various types of mental disorders were treated with F.S.S.P. Of this group, 125 cases were treated in private office practice. Approximately 120 service men were treated during World War II at Camp Crowder, Missouri, and at Fort Warren, Wyoming, NP Consultation Services, and in a clearing station with the 87th Infantry Division in the European Theater. Over 158 cases were treated at two Minnesota State Mental Health Clinics at Fergus Falls and Albert Lea, Minnesota. This paper does not include over 150 cases where a follow-up study could not be made to determine whether the improvement was sustained for a reasonable length of time.

Method and Procedure

Some minor changes in the technic have been made since the first reports[1,2] of this method were published. The instrument used is quite similar to the one originally described. The unit consists essentially of a relatively weak source of high voltage electricity, which, because of its high internal impedance, gives a safe and constant current regardless of the load. For this reason no electrode paste is required and no burns were ever experienced. The faradic current is of spike wave form and of approximate 300 to 400 cycles. Although the open circuit voltage is high, the terminal voltage as applied to the patient's head does not exceed 80 volts (r.m.s.). Neither grand mal convulsions nor even petit mal attacks have ever been produced in the writer's experience with this method. To lessen apprehension of the patient, the machine is partially obscured under the head of the examining table and a foot switch is used to make and break the current.

After a detailed history is taken and a physical examination, the patient is assured that his condition can be definitely improved, but the improvement can be hastened with the faradic treatment. He is fully reassured that no danger is involved with this treatment, and only momentary discomfort is experienced. He is told that the treatment acts like the starter of an automobile and it merely helps him get started in the right direction. He is further told that not only relief of his emotional conflicts can be expected but further psychological material may be uncovered which may prove invaluable in the treatment. No patient is for-

cibly made to take this treatment. The usual safeguards required with E.C.T. are unnecessary. Since no attendants are needed, the patient is treated and interviewed alone.

After two electrodes held by a rubber band are applied over the temporal regions, an ampoule of sodium amytal, grains 3¾ dissolved in 5 c.c. of distilled water, is rapidly injected intravenously. This subnarcotic dosage is well under the safety factor and can be given without danger. The patient is instructed to close his eyes and clench his teeth (to prevent biting of the tongue). About three seconds after the injection the drug begins to take effect, and a series of from two to four electric stimulations are given in rapid succession. In the more apprehensive patient a weak current is given at the outset and in subsequent treatments the controls are set higher. This differs from the originally described procedure. It was found that giving the injection before the electric stimulation greatly lessens the apprehension of the patient. It was also found that intravenous sodium amytal is more effective in this type of treatment than pentothal sodium, which was employed originally, as the patient is made less drowsy and more talkative. Also, the desired relaxation of the patient persists for a considerably longer period of time. At first, the patient usually appears startled and then his emotions are released by crying, laughing, or the intermingling of both. In depressed cases, the patient is allowed to cry for a short period, but if questioned, "Why are you crying?" he usually begins to talk. With a little reassurance, they become relaxed and talk more willingly and freely about matters which were previously suppressed.

In cases of conversion hysteria the electrodes are usually applied over the involved areas instead of over the temporal regions, for purpose of suggestion. For example: in hysterical aphonia the electrodes are placed over the neck, in camptocormia, over the small of the back, and in hysterical paralysis, over the involved extremity.

Since this treatment is recognized only as an adjunct to psychotherapy no specific number of treatments are given. The number of F.S.S.P. is governed by the progress made by the patient. In some cases, improvement is so marked after only one treatment that subsequent visits are handled by interviews alone. Usually at the beginning, daily treatments are preferable. After two or three treatments, they are given bi-weekly and then weekly until definite sustained improvement is observed. In the two Mental Health Clinics only weekly treatments are given, as the psychiatrist is in attendance only one day a week. If sustained improvement is not observed after ten treatments, continuation with this method is not considered worthwhile. Less than five per cent of the patients refused to receive further treatments after the first F.S.S.P. Although many in this group admitted that the treatment gave them some relief, they preferred to continue with psychotherapy alone. Some patients have returned after several weeks or months for one or more F.S.S.P. when they felt the need of receiving additional psychiatric help.

The following are brief case reports fairly representative of different reaction types treated by this method.

Simple Depression

Case 1—M.C., aged 47, and married. Following severe financial losses in his fruit brokerage business he became depressed. For seven months he was despondent, refused to leave his house, and remained mute for long periods at a time. He developed strong feelings of guilt and unworthiness, and even talked of suicide at times. When he began to show some paranoid trends, his wife tried in vain to persuade him to go to a hospital for treatment. With some reluctance he was brought to the writer's office. Following the first treatment with F.S.S.P. his anxiety and tension greatly diminished. He was brought to the office for treatment daily for three days and then twice a week for three weeks. He showed progressive improvement after each successive treatment. He was so improved following the tenth treatment that with little persuasion he procured a job doing common labor work in a wholesale fruit business. He continued to return bi-weekly for brief psychotherapy for five sessions. Now, four years later, he has been back in business for himself for three years and is making a very satisfactory adjustment.

There can be little doubt that this patient's recovery was considerably hastened with this treatment. As he considered it a stigma to be hospitalized in a sanitarium, he was extremely grateful that he recovered without being hospitalized.

Anxiety Neurosis

Case 2—R. R., female, aged 40, married, but has no children. She gave a history of having had a "nervous breakdown" shortly after her marriage when she was 17 years of age. At 30 years of age she had an artificial menopause following a panhysterectomy for a tubal pregnancy. Her husband drank heavily at times which frequently upset her in the past. To keep herself occupied she worked in a restaurant, but quit her job one year ago to have an operation for "abdominal adhesions." Since then she became more restless, tense, and anxious. She developed several somatization reactions such as "light and numb feelings on top of my head," irritable bowels, and palpitation. She was hospitalized in a sanitarium by a psychiatrist and given one E.C.T. She claimed that the effects of this treatment made her condition worse, and she left the hospital the following day against medical advice. One week later she was referred to me for treatment. A careful physical examination was made but reassurance given her failed to give her relief. The following day she showed marked improvement after the first F.S.S.P. She failed to return the next day as instructed, but returned a week later and stated that she had felt "fine" for three days, but then her symptoms slowly returned. She was given four more treatments at weekly intervals and after the fifth treatment her recovery appeared sustained. Her husband became more understanding of her condition and discontinued his drinking. She returned to work, and has kept in contact with me for six months. Her recovery has been maintained during this period.

This patient became markedly upset when hospitalized with psychotic patients. She also became more frightened from the effects experienced from an E.C.T. It took some coaxing to persuade her to take the first F.S.S.P., but after she experienced such marked relief she willingly received further treatment. The rapid response in this case was striking and showed that this treatment greatly facilitated the psychotherapy she required.

Conversion Hysteria

Case 3—M. D., male, colored, aged 23, single. He was inducted into service August 1, 1942. Because of persistent complaints of backaches of two years duration, a spinal tap was done at Scott Field Station Hospital in October, 1943. He claimed he became completely paralyzed for one week after this procedure. He was then transferred to another Air Base where he was hospitalized again for the same complaint of continuous backaches. X-rays taken at this hospital showed moderate narrowing between the third and fourth lumbar interspace and a diagnosis of "probable herniation of a disc" was made. He refused both surgery and myelographic examinations. He was then transferred to Fort Warren. There, his company commander noticed that each week a more forward-leaning flexed position was assumed. It was observed, however, that he could lie flat on his back in bed without discomfort. He was referred to the NP Consultation Service where a diagnosis of camptocormia or hysterical bent back was made. This condition is prone to contagion in susceptible individuals. When told that he could be helped with faradic stimulation, he agreed to receive the treatment. The electrodes were placed over the small of his back and he was given an F.S.S.P. Following the momentary faradic stimulation he gave out a sharp cry. A few moments after the treatment he was able to stand with his body erect and completely relieved of pain. Two other colored enlisted men with similar conditions, waiting for treatment in an adjoining room, straightened up almost completely as soon as they saw what had transpired. Because this patient had a hysterical make-up with borderline intelligence, and gave a history of backaches prior to induction he was separated from the service.

Case 4—D. M., male, aged 27, married, high school graduate. One year prior to his induction into service his back had been injured. He was fitted with a heavy metal brace and received $500 compensation for the accident. During basic training at Camp Crowder he claimed that he again injured his back. Repeated physical and X-ray examinations failed to disclose any structural changes. In a period of six months he was presented before a C.D.D. board twice for separation from service. On both occasions he was referred to a Section VIII board for discharge for malingering, but the latter board failed to find sufficient evidence to warrant a "blue discharge" and returned him to duty. His limp became more exaggerated and as time went on he literally dragged his left leg. He was referred to the NP Consultation service where a diagnosis of conversion hysteria was made. He willingly agreed to receive an F.S.S.P. Immediately after the treatment he was able to walk normally. He appeared elated and even danced a jig to show us how much he had improved. He gave us his heavy brace and stated he did not think that he would have any more use for it. However, he admitted that he greatly feared being shipped overseas. Realizing that he was too unstable emotionally to perform in combat duty, he was asked how he felt about being placed on limited duty as an orderly at the Station Hospital. He showed great interest in this suggestion. Approval was obtained from the personnel officer and he was transferred to the Station Hospital. There he continued to make a very satisfactory adjustment as a hospital orderly and his limp had not returned during the following seven months I was stationed at Camp Crowder.

Over a score of various types of conversion hysteria cases were treated and relieved

of symptoms with this method in World War II. Hysteria differs from somatization reactions. In hysteria the original impuses causing the anxiety are "converted" into functional symptoms localized in different parts of the body that are under voluntary control, whereas in somatization reactions anxiety is relieved through the autonomic nervous system into visceral organ symptoms. For sustained improvement it was found that some solution satisfactory to the patient is necessary. Recurrence or other complaints usually result unless a different assignment or a satisfactory compromise is made with the patient. As in other types of mental disorders the symptoms may be removed by this treatment, but adequate psychotherapy and readjustment is necessary for lasting improvement.

Somatization Reactions

Case 5—L. T., female, aged 15, and markedly overweight. While in school she began to sneeze. This sneezing continued every ten to fifteen seconds all through the day, and disappeared only when she was asleep. She was in the ninth grade and she was excused from class because her condition was so annoying to others. Repeated physical examinations were negative. Sedative and antihistamine drugs which were prescribed by different physicians failed to give her relief. She was hospitalized and 10 per cent cocaine nose packs gave only transient relief. Another physician painted her middle tubinate with 20 per cent silver nitrate which again gave her relief for only a few hours. Another physician found that skin sensitization tests revealed some minor allergies, but subsequent diet modifications prescribed failed to help her. She was referred to the Albert Lea Mental Health Center four months after the onset of this condition. The sneezing stopped immediately after one F.S.S.P. was given (one year ago). Psychological tests given her that same day showed that her IQ was 75 and permission was obtained for her to leave school and to obtain employment. She was sensitive about her inability to keep up with her class work and also about her overweight. She was then placed on an anti-obesity diet. Her case was followed for over one year. During this period she lost 45 pounds and continued to be gainfully employed doing housework. Her disposition, attitude, and behavior had markedly improved and she has had no further recurrence.

In this case the anxiety was apparently relieved by the channeling of her original impulses through the autonomic nervous system into organic symptoms. Sustained improvement was obtained after one F.S.S.P., plus the necessary arrangements that she discontinue her schooling because of her limited mental capacity.

Obsessive-Compulsive Neurosis

Case 6—S. S., female, aged 54 and married. She had a "nervous breakdown" 30 years ago, and severe headaches off and on for the past 15 years. The headaches she admitted were brought on by nervousness or fatigue. She was very religious and considered sex relations as wicked. She was reluctant to discuss this subject but did confess that she had never experienced an orgasm. She constantly washed her hands and for four years had extreme fears of losing her mind and of being in crowds. She was given five weekly F.S.S.P. treatments at the Albert Lea Mental Health Center and showed improvement with each successive treatment. After these treatments she returned for further psychiatric interviews every two weeks. The improvement in her behavior and general attitude was most striking. Her fear of insanity left and she again began to live a more useful and normal life. She said her headaches have become far less intense and less frequent. Her attitude toward her home and family greatly improved and she stopped her former habit of frequently washing her hands. Six weeks after the last F.S.S.P. she asked for another treatment as she felt her symptoms were returning. She has remained well adjusted for two months now since her last treatment. The improvement she made was quite gratifying even if she should require an occasional treatment from time to time, considering her age and the chronicity of her illness.

Recurrent attacks of acute anxiety in obsessive-compulsive neuroses which greatly incapacitate the patient are fairly common. Since these patients so frequently fear that they will become insane, hospitalization often tends to reinforce such fear. Only advanced cases with marked disorder of behavior should be hospitalized. Striking improvement has been obtained in the majority of patients treated with this condition which is more commonly seen in private practice than is suggested in text books.

Schizophrenic Reaction Types

Case 7—L. B., male, aged 27, single. This soldier was of Italian origin. He was inducted into service and trained with an anti-aircraft unit. Overseas, after receiving only four weeks of infantry training, he was transferred to a combat division as a rifleman. The first day in combat in the "Battle of the Bulge" he collapsed and was taken to a clearing station located in a Belgian schoolhouse. For four days he remained mute, negativistic, and stuporous, but on one occasion he became fright-

ened when two nuns entered the room. After an injection of sodium amytal he became more relaxed, but he still appeared perplexed and talked very little. The following day there was no change in his behavior and he was given an F.S.S.P. with the same amount of amytal. Immediately after the treatment he shouted out, "What are you doing with me?" He then broke out into laughter saying, "I thought I was dead, I can talk now! . . . Where am I?" During the interview he told of his recent experience in the front lines. The last he could recall was that a large German Tiger Tank was approaching him as he was holding a "Bazooka." He had never fired one before and said that he must have "blacked out." He said he thought he was in heaven when he saw the two nuns enter his room. He insisted that he did not want to be sent back home and be dishonored. He told me that during his basic training he was excused from long hikes because of flat feet, and placed in an anti-aircraft unit for this same reason. When he was offered an opportunity to be placed in the field artillery in the Division he showed much enthusiasm. A reassignment was effected and I was kept informed of his progress by the Catholic Chaplain for the next two months. I learned later that he made an excellent adjustment as a forward observer in his unit.

Case 8—R. C., male, aged 24, single. He attended the School of Pharmacy at the University of Minnesota for one year, but was unable to keep up with his class and gradually became shut-in and paranoid. After attacking a stranger on the street he was committed to a state hospital where he was given nine E.C.T. and sixteen deep insulin shock treatments. His condition improved and he was discharged. A year later, he obtained a job as a laboratory technician where he was employed for two years. He had sufficient insight to realize that he needed help as he was unable to make friends, felt inferior, and was unable to meet life realistically. Since he was working he came to my office only on Saturdays. After each F.S.S.P. he revealed more about his past life. He felt rejected as his parents never showed him enough affection and never praised nor encouraged him. He continued to improve with each successive treatment, receiving a total of eight treatments. He joined a hiking club, entered a dancing school, joined his company's bowling team and became more careful about his personal appearance. Even his hands, which formerly felt cold and clammy, had a natural warmth. He gained 14 pounds in six months, and continued taking an active part in outside activities. He said, "I never realized how much fun one can have," and "I now use every minute of my spare time." He now feels he is accepted by his fellow workers and he no longer feels inferior.

It is not difficult to understand why some schizophrenic reaction types respond favorably to this type of treatment. Freud[14] was one of the first to show that a close relationship exists between hysteria, the prototype of psychoneurosis, and schizophrenia. Likewise, Pavlov[15] has offered considerable evidence to show that schizophrenia may be regarded as a marked degree of chronic hysteria. In selected patients who have available assets, out-patient treatment with this method appears to offer promise. Forcing the patient into a stimulating outside adjustment is preferable to protected hospital environment where autistic elaboration and habit-deterioration is made easier for him.

Comment

The results obtained with the use of F.S.S.P. at two Minnesota state out-patient clinics and in the writer's private office-practice are presented in Table I, II, and III. Because it was often impossible to follow many cases treated with this method during World War II at two NP Consultation Services and in a clearing station overseas, a satisfactory tabulation of the results was not feasible. The results obtained, however, appeared to be fairly comparable to those given in the tables.

The term "sustained improvement" employed in these tables represents either remissions or marked improvement for a duration of two months or more.

The patients at the Mental Hygiene Clinic at Fergu Falls (Table I) were treated by Dr. Donald Reader, the psychiatrist in charge. His results were comparable to those obtained by the writer at the Albert Lea Community Mental Health Center (Table II) with the exception of schizophrenia. Several schizophrenics in his group were chronic cases and formerly patients in a state hospital. Better results were obtained in private office-practice (Table III) than in either of the out-patient clinics. This is explained by the fact that most of the patients at first were given treatment more often than once a week.

Although the number of cases treated with F.S.S.P. is not large enough for a significant statistical study, the results shown in these tables indicate that in the majority of patients treated, remission or marked improvement was obtained within a comparatively brief period of time.

Discussion

According to Landis[16] any therapeutic method, either physical or psychological must satisfy two major considerations. It must be self-evidently rational and it must be effective. In mental disorders logical and methodological considerations are difficult and sometimes impossible to meet. Like other types of shock therapies, F.S.S.P. is a non-specific symptomatic remedy and not a "cure." Psychotherapy is also recognized as an admixture of non-specific procedures and in the treatment of mental disorders, concentration on maximal benefits with all non-specific therapies is justifiable. To repeat Pierre Janet's often quoted phrase, "The psychotherapist who understands his patient well and who knows how to use psychological stimulation succeeds with any method he cares to use."

The writer believes that several factors contribute to the effectiveness of F.S.S.P. Kalinowsky and Hoch have questioned the value of the electrical phase of this treatment, "because it does not differ from the faradic applications used by physicians in former times" and consequently they believe that the "beneficial effects of this treatment should be attributed to the barbiturates." They may be right in questioning the rationale used by physicians in former times who administered electric stimulation in the treatment of mental disorders, but the observations made by such men as Allbutt,[17] Arndt,[18] and numerous other forerunners of contemporary shock treatment referred to by the writer,[1] Stainbrook,[19] and by Cerletti[20] himself cannot be disregarded. Only recently, Alexander[21] wrote that non-convulsive treatment was regarded as so unpleasant by the patient that he did not explore its possibilities until he learned of Hirschfeld's method of administering electric stimulation under sodium pentothal anesthesia. It may well be that physicians in former times

TABLE I

RESULTS WITH F.S.S.P. AT STATE MENTAL HYGIENE CLINIC, FERGUS FALLS, MINN.

Psychiatric Diagnosis	No. of Patients	No. of F.S.S.P.	Avg. No. of Treatments	Sustained Improvement	
				No.	%
Reactive depression	5	15	3.0	3	60.0
Anxiety neurosis	8	16	2.0	5	62.5
Somatization reactions	13	98	7.5	8	62.0
Obsessive-compulsive states	14	89	6.4	9	64.3
Neurasthenia	1	5	5.0	1	100.0
Mixed neurosis	14	56	4.0	9	64.3
Total psychoneuroses	55	279	5.0	35	63.6
Schizophrenia	11	61	5.5	1	9.1
Manic-depressive	6	33	5.5	2	33.3
Involutional melancholia	4	10	2.5	1	25.0
Total psychoses	21	104	4.9	4	19.0
Grand total	76	383	5.0	39	51.3

TABLE II

RESULTS WITH F.S.S.P. AT COMMUNITY MENTAL HEALTH CENTER AT ALBERT LEA, MINN.

Psychiatric Diagnosis	No. of Patients	No. of F.S.S.P.	Avg. No. of Treatments	Sustained Improvement	
				No.	%
Reactive depression	12	28	2.3	10	83.3
Anxiety neurosis	20	41	2.1	14	70.0
Conversion hysteria	11	40	3.6	9	81.8
Somatization reactions	2	4	2.0	1	50.0
Obsessive-compulsive states	15	66	4.4	10	66.6
Neurasthenia	4	18	4.5	3	75.0
Mixed neurosis	12	45	3.7	4	33.3
Total psychoneuroses	76	242	3.2	51	67.1
Schizophrenia	6	24	4.0	4	66.6
Total psychoses	6	24	4.0	4	66.6
Grand total	82	266	3.2	55	67.1

TABLE III

RESULTS WITH F.S.S.P. IN PRIVATE OFFICE-PRACTICE

Psychiatric Diagnosis	No. of Patients	No. of F.S.S.P.	Avg. No. of Treatments	Sustained Improvement	
				No.	%
Reactive depression	26	184	7.1	21	81.0
Anxiety neurosis	12	88	7.3	9	75.0
Conversion hysteria	3	16	5.3	2	66.6
Somatization reactions	7	17	2.4	5	71.4
Obsessive-compulsive states	41	311	7.6	26	63.4
Mixed neurosis	5	35	7.0	3	60.0
Total psychoneuroses	94	651	6.9	66	70.2
Schizophrenia	27	242	8.9	17	63.0
Manic-depressive	1	8	8.0	1	100.0
Involutional melancholia	2	22	11.0	1	50.0
Total psychoses	30	272	9.1	19	63.3
Grand total	124	923	7.4	85	69.5

discontinued the use of electric stimulation because of the unpleasant nature of the treatment and not because the treatment proved ineffective. The faradic stimulation is used as a means of producing psychophysiologic stimulation: to use Janet's[22] phrase, it is "a treatment by excitation," or by Selye's[23] concept, it may be considered as an "alarm reaction evoked by sudden exposure to stimuli to which the organism is quantitatively or qualitatively not adapted." Janet predicted in 1925, "Some day perhaps electricity will be one of the most valuable among the agents that can modify and stimulate these patients." He warned, however, that exhaustion was a great danger in such treatment but rapid acting intravenous barbiturates were not available at that time.

The writer agrees that part of the beneficial effects of this treatment may be attributed to the intravenous barbiturates employed. At first these injections were given chiefly to allay the fear and anxiety resulting from the faradic stimulation. It was soon found, however, that the barbiturates, particularly sodium amytal,[2] increased abreaction, removed inhibition, permitted the patient to discharge suppressed emotional material more freely, and also rendered him more susceptible to suggestion. Barbiturate interviews were later used extensively during World War II by Wilde,[24] Horsley,[25] Grinker and Spiegel.[26] Since then this procedure has become widely used. It may be added that many workers[27] are now giving intravenous barbiturates with E.C.T. to prevent fractures as well as to allay fear and anxiety of the treatment. The assumption of Kalinowsky and Hoch that the beneficial effects of F.S.S.P. should be attributed entirely to the intravenous barbiturates was not substantiated. In a series of 25 cases 3¾ grains of sodium amytal was given intravenously without faradic stimulation. One to two days later the same patients were given the same amount of sodium amytal with faradic stimulation. Far better response was obtained with the latter treatment, indicating that the combination is definitely superior to that obtained from the use of amytal alone. The use of intravenous sodium amytal has been likened to a "psycho-chemical starter." The prolonged sedation effect following the treatment also serves as an important factor in many of the patients who had experienced relief and relaxation for the first time after a lengthy period of increased anxiety and tension. Since many mental disorders are presumed to be habit disorders, it appears that this treatment helps to replace some of their undesirable habits with normal behavior, and re-learning is facilitated with the psychotherapy given with this somatic treatment. Of course, the suggestive influence also plays an important role in F.S.S.P. as in all types of somatic treatments and psychotherapies. In 1886, Blandford[28] wrote that the improvement from electrical stimulation was due to "moral" rather than to physical causes. In some of the depressed patients, the discomfort experienced from the electric stimulation may be interpreted by them as a means of atonement for their guilt feelings. Undoubtedly other unknown factors may also contribute to the effectiveness of this treatment.

Fundamentally F.S.S.P. may be considered a part of total push therapy. All three, faradic stimulation, intravenous barbiturates, and last, but not least, psychotherapy, contribute to the effectiveness of the treatment. The original concept that the convulsions were the essential element in shock treatment had discouraged many workers from using non-convulsive electric stimulation. Now, several electric non-convulsive methods, mentioned above, are replacing E.C.T. in the treatment of certain types of mental disorders.

In many psychotic patients E.C.T. is still indicated, particularly when confusion and severe "amnestic reactions" are considered desirable. The statement made by Kalinowsky that "an immediate loss of consciousness . . . makes refusal of E.C.T. a rare occurrence," is not the usual experience. From the writer's observation, patients who have received both E.C.T. and F.S.S.P. show far more fear of the E.C.T. Particularly in the treatment of minor psychoses, E.C.T. is often harmful because of the patient's fears and it fails to bring important psychological and sociological factors to light. The use of F.S.S.P. fosters the patient's active participation in the therapy whereas in E.C.T. the

patient's role is essentially passive. Adequate psychotherapy is required if sustained improvement is to be expected. F.S.S.P. is not considered either a panacea or an adequate substitute for E.C.T. in all types of mental disorders and its use is recommended before more drastic methods are employed. To use an analogy, why use a sledge hammer where a tap hammer could be used as effectively? Even with adequate psychotherapy given in conjunction with F.S.S.P. occasional relapses do occur. One patient with a depression, who had made only a marginal adjustment in the past and was a former state hospital patient, responded well to this treatment, but relapsed two months later when she learned that her daughter had a carcinoma of the cervix. She responded well to three F.S.S.P. but three months later again relapsed when she learned that her grandson was missing in action in Korea. Again she improved after four treatments and has been making a satisfactory adjustment now for six months. Spencer[29] defined life as "The continuous adjustment of internal relations to external relations." It is obvious why in mental conditions the use of the word "cured" is not justifiable.

F.S.S.P. differs somewhat from Hirschfeld's method. In the latter method the patient is anesthetized with about six grains of sodium pentothal and is then stimulated with a current from two to five minutes, while he remains in an unconscious and semi-conscious state. Just how much therapeutic effect a patient may derive from electric stimulation while in an unconscious state is questionable. The writer compared the procedures by alternating both methods in a group of ten patients. Six patients preferred faradic stimulation with intravenous sodium amytal, two preferred the treatment with Hirschfeld's method and two were noncommittal. In this small series of cases the clinical results appeared to be the same. The main difference between the F.S.S.P. and Hirschfeld's method lies more in the procedure followed than in the type of electrical instrument used. For obvious reasons, it is best to treat a patient who retains consciousness throughout the procedure.

The use of F.S.S.P. in out-patient treatment offers many psychotherapeutic as well as economic advantages. It affords the patient the opportunity of remaining at his job, of continuing his normal social routines, and of sparing him the psychologic trauma of being confined in a mental hospital. The economic factor is of considerable importance also as the cost of private hospitalization or of lengthy psychoanalysis is prohibitive in most cases.

Summary and Conclusion

1. A safe and simple procedure is presented which can be administered in out-patient practice without attendants or the usual safeguards required with E.C.T.

2. The term F.S.S.P. (faradic stimulation-sedation-psychotherapy) is used to differentiate it from other shock therapies.

3. This type of treatment opens the way for psychotherapy. It fosters active participation of the patient in contrast with E.C.T. where the patient's role is essentially passive.

4. The patient retains consciousness throughout the treatment.

5. F.S.S.P. does not supplant E.C.T., but it is effective in some types of mental disorders, particularly in minor psychoses where E.C.T. is generally considered contraindicated.

6. Because this treatment is considered only as an adjuvant to psychotherapy it should be administered only by a qualified psychiatrist.

7. Sustained improvement was obtained in over 63 per cent of both major and minor psychoses treated with an average of only 5.6 F.S.S.P. treatments per patient.

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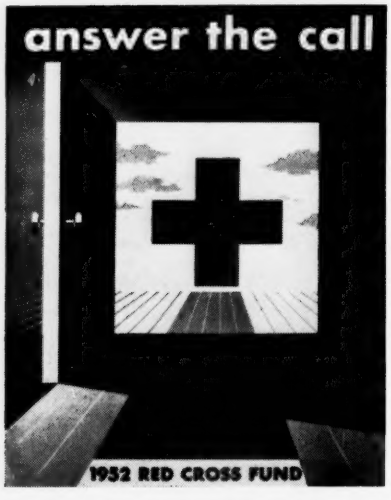

Neurobiologic Research in Psychiatry

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The area of interest of the Neurobiologic Unit and Research Clinic during the past three and one-half years has been a border field between the mental and the physical in continuation of the Myersonian approach. Two groups of illnesses in which this approach was most fruitful were multiple sclerosis and the major psychoses.

Multiple sclerosis was included because there was reason to consider this disease, especially in view of Langworthy's[1] observations, at least in part, a psychosomatic problem. In fact, it is the only organic illness of the nervous system in which psychosomatic reverberations are of outstanding importance both at onset and during its course. Our first effort was to study the natural history of the disease which required continued observation from many points of view of a sizable clinic population now reaching 500 patients.

We soon found that there was a need for an objective quantitative means to express and record the degree of involvement and disability so that a one-item score[2] thus derived could be correlated with other one-item variables such as blood pressure, capillary resistance,[3] blood antistreptolysin level, and whatever other variables we may wish to study and correlate with the clinical course as well as with therapeutic efforts. Therapeutic efforts which could thus be tested objectively were blood transfusions,[4] psychotherapy[5] including group therapy,[6] allergen-free diet,[7] vitamin medication and endocrine substances including ACTH and Cortisone.[2] Stress factors influencing the disease could likewise be evaluated objectively. Outstanding among these are emotional stress, injuries and accidents, intercurrent diseases, especially streptococcal infections, pregnancy and puerperium.

In the major psychoses the fruitful border field for our approach was the more precise elucidation of special features of physical treatment which may be responsible for their psychophysiological effects. For this reason we attempted to separate in the field of electric treatment, electric stimulation below the threshold necessary for setting off a major tonic-clonic convulsion[8] from the types of stimulation which elicit a major tonic-clonic convulsion; and in the field of convulsive treatment we attempted to separate the tonic phase from the clonic phase. We thus found that nonconvulsive stimulation relieves anxiety but may enhance depression.[8] Purely myoclonic stimulation just below the grand-mal threshold acts likewise. The major tonic-clonic convulsive treatment relieves depression but may enhance anxiety. When the clonic phase is completely eliminated from the convulsive treatment by continued electric stimulation, it in no way detracts from its anti-depressant effect.[9] Hence, we were able to prove conclusively that the clonic phase is not necessary for the relief of depression, but that this relief depends entirely on the tonic phase. What is the meaning of these findings in the scheme of neural dynamics of mental disorder?

It has become generally accepted that psychoses belong to the illnesses of stress in the widest sense of the word. There can be little doubt that the stress primarily impinges upon or originates in the psyche or the mental life and that the initial processes of adaptation, struggle or exhaustion are going on in the psychodynamic field. At some point in the chain of events these psychodynamic processes must utilize or express themselves through brain mechanisms which are the final common paths of all processes of thinking, feeling speaking, etc. The question has never been answered whether these brain mechanisms themselves are abnormal prior to the onset of the psychodynamic struggle which certainly is the precursor of every psychosis. The individual would thus be

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placed at a disadvantage by having to fight a complicated campaign with inadequate resources of supply or design of neutral power. There is convincing proof that these neural mechanisms become severely disturbed early in the onset of the psychosis. Funkenstein and his co-workers[10] discovered a clearcut and easily tested set of profound disturbances involving these neural mechanismsm, namely the abnormality in reaction to sympathetic and parasympathetic substances associated with changes in the parasympathetic and sympathetic tone. These authors could not decide which of the two changes is the primary one, the psychodynamic or the neurovegetative. They concluded that the two fit together as the hand fits into a glove without stating, however, which is the hand and which the glove.

Since faulty neural mechanisms do exist, their correction would offer great practical, therapeutic and preventive opportunities. These neural mechanisms must play a role somewhere, if no other way than as a final common path. It may even be helpful prior to knowing more about the basic mechanisms, to find out more about the nature of these final common paths in the brain. While known data are yet greatly insufficient to propound a theory, some physical treatments nevertheless supply a few clues as to what these neural mechanisms, concerned with the final common paths in the brain, may be. It is of interest to note that electric treatment is ineffective for the relief of depression when it fails to bring about the tonic stretch or phase of a major convulsion which is due to excitation of the subcortical ganglia. The clonic phase which is due to excitation of the cortex adds nothing to the therapeutic effect and whenever the electrical stimulus has brought about merely cortical excitation such as in nonconvulsive or myoclonic treatment, depression is not relieved at all or may be aggravated. Anxiety alone is relieved by this procedure. This phenomenon supplies two important clues, first that strong stimulation of the subcortical gray matter is needed to relieve depression (which may enhance anxiety) and secondly that stimulation of the cortex will relieve anxiety (which may enhance depression). Could it be that in depression either primarily or secondarily an inhibition in the activity of subcortical ganglia has taken place, while cortical activity is relatively enhanced? And could it be that in anxiety, cortical activity is inhibited while subcortical activity is relatively enhanced? The state of the defenses in these two conditions may support these possibilities. There is no doubt that defenses, being a blind unconscious response, are most likely mediated by subcortical structures. These defenses are down in depression, i.e., when we may presume the subcortical structures to be inhibited. They are up in anxiety when we may presume the activity of these subcortical structures to be relatively enhanced. This view has further support in the observation that the most marked and profound states of anxiety may be seen in states of severe and acute toxic decortication such as in cases of tetraethyl-lead poisoning (Kehoe,[11] Hamilton, Reznikoff and Burnham,[12] Alexander[13]). On the other hand, severe depression has been observed as an early and sometimes only sign of slow growing thalamic tumors, such as in the case of an astroblastoma of my own experience.

Insight is obviously a cortical function. Insight is greatly enhanced in certain depressions when defenses are down, while it is always severely inhibited in anxiety states when defenses are up. The incessant ruminations of the severe depressive are additional suggestive indications of a state of cortical excitation that is out of control of the self-protective unconscious forces of the basic subcortical self. When this protective unconscious force, however, runs rampant, such as it seems to be doing in anxiety states, cortical activity may become inhibited. This rudiment of a theory seems to fit the experiences derived from electric treatment. Convulsive electroshock excites the subcortex (presumably inhibited in depression) and may quiet the overactive cortex, thus relieving depression, strengthening the defenses and lowering the over-zealous insight. Nonconvulsive treatment excites the underactive, disorganized, confused cortex and may quiet the overactive unconscious subcortical protective mechanisms, thus relieving anxiety, enhancing insight and lowering defenses. Further study from many

angles is needed to see whether these few correlated facts and assumptions may prove stepping stones to further advance toward understanding these complex relationships.

Insulin treatment in its earlier phases, and particularly during each immediate post-treatment phase seems to act like nonconvulsive electric treatment in that it stimulates insight and other cortical activity and lowers defenses by toning down subcortical activity. In its later phases and especially in its overall effect it stimulates basic mood and healthy defense formation in a way suggestive of a stimulating effect upon subcortical centers without, however, too much inhibition of cortical activity and building up of precipitous defenses, such as occurs with convulsive electric shock. This more general, less unilateral action may account for the greater smoothness and for the greater slowness of the effect of insulin coma treatment. It appears to restore the balance of both cortical and subcortical activity rather than strengthening one at a time. Insulin subcoma acts more like nonconvulsive treatment in that it relieves anxiety and lowers defenses obviously by enhancing cortical activity and toning down the excitation of the subcortex. The reaction is less intense since it does not cause a rebound of depression resulting in smoother and slower control of the disturbance. The manner in which insulin accomplishes these results is obscure although it is observed that profound rearrangement of the nucleoproteins of the nerve cells appears to be taking place (Lorentzen[14]). If it could be demonstrated that these changes affect the cortical neurones first, and in subcoma doses foremost, a new means of integrating the resulting psychologic changes with definite levels of the final common path of brain activity may be at hand. This is one of the frontiers on which new data may yield important territories of knowledge.

From the point of view of this rudimentary theory, lobotomy would merely prevent reverberation between these two relay stations within the final common path. If we view brain circuits as self-reexciting chains of neurones activated by feed-back mechanisms (McCulloch[15]), we can understand that interruption of the connection may set either relay station at peace. And that is why lobotomy may control either depression with its suggestive subcortical inhibition and cortical excitation, or, better still, anxiety and hostility with their surmised subcortical excitation and cortical inhibition.

The most puzzling territory still is the way in which drugs that stimulate and inhibit the autonomic nervous system act upon the syndromes of the major psychoses and especially their two basic mood components, anxiety and depression. Funkenstein and his co-workers[10] have proven that in depression there is an enhanced tone of the sympathetic nervous system associated with increased reaction to parasympathetic (cholinergic) stimuli, while conversely in anxiety the basic tone of the parasympathetic (cholinergic) system is increased, associated with increased reactivity to sympathetic (adrenergic) stimuli. Nevertheless, cholinergic drugs have failed as antidotes to depression and adrenergic drugs have failed as antidotes to anxiety while actually the reverse may be true in slight measure. Mecholyl, a cholinergic drug may sometimes relieve anxiety and benzedrine, an adrenergic drug, relieves depression to a mild degree, although it has no marked or sustained effect, especially if the depression has any degree of severity. This seems to indicate that these drugs merely tone down the over-reactivity to the opposing substance, to cholinergic stimulation in depressions, and to adrenergic stimulation in anxiety thus exerting a splinting or shielding effect as it were, rather than effecting a basic alteration in sympathetic or parasympathetic tone respectively.

The manner in which the significant shifts in autonomic balance, which characterize successful therapy and recovery of psychotic states, take place remains entirely obscure. A marked immediate sweating response is typical of most of the therapies employed, particularly of nonconvulsive electric treatment and of insulin treatment, coma and subcoma. It seems to be particularly characteristic of all treatments that relieve anxiety, but it also appears to be important in electric shock treatment that relieves depression. In my clinical observations I have always taken note of the occurrence, the timing (onset and duration) and the degree

of the sweating response. These experiences appear to indicate that the anti-depressant effect of electric shock treatment was more pronounced whenever the sweating response was of marked degree and occurred within the first 40 seconds. Since sweating is probably a cholinergic response this would make sense in the light of the fact that the sympathetic tone is increased in depression. It would not explain, however, why this factor is also indicative of a good response to nonconvulsive treatment which relieves anxiety, or to insulin subcoma treatment which also relieves anxiety primarily. It also is a marked feature of ether drip infusion treatment (for depression), as well as of such long forgotten treatments as Weir Mitchell's so-called rest cure, during which the patients were wrapped in warm blankets to the point of profuse perspiration, or of such old standbys as the pack treatment or the hot bath for states of agitation and excitement, used widely in the past in mental hospitals, prior to the advent of the shock therapies. Veterinarians have also used the age-old principle of the sudorific in treating a state of inert listlessness, akin to a depression, which occurs sometimes in horses. An injection of pilocarpine produces a profound sweating response in the afflicted horse, with oversecretion from the lacrimal and salivary glands. Sometimes one such treatment may restore a horse to its former spirit.

There is a great need for further study of the action of drugs in the major psychoses. Thus far, we understand more about the opposite side of the picture, namely the experimental production of psychoses by certain drugs, such as mescalin. It is, however, within the realm of possibility that shock treatments may someday be replaced by a variety of "pills"—one of their ingredients would have to be a powerful cholinergic (parasympathomimetic) substance, probably within marked sudorific side effects.

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Paradoxical Tears — Tears of Happiness

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There are tears o' pity, an' tears of wae,
An' tears for excess o' joy will fa',
Yet the tears of luve are sweeter than a'!
ALFRED TENNYSON, "*Scotch Song.*"

Too frequently, the regimented unknown, confirmed and made banal, loses its connotation of the unknown; the accent is conveniently shifted to the banal. Tears are a case in point. So far, nobody has explained the psychology of crying; nevertheless, everyone accepts tears of unhappiness and misery as a commonplace phenomenon. From Ovid's dictum in Tristia: "It is a relief to weep; grief is satisfied and carried off by tears," to Voltaire's: "Tears are the silent language of grief," runs a straight line of faulty reasoning: commonplace, therefore understandable. The crux of the matter, an explanation of the physical sign, is gratuitously disregarded—why should precisely tears, rather than, say, a twitching of the nose, be produced.

Everyday observation does better in collecting examples testifying to the misuse of the "commonplace." Tears can be used hypocritically ("crocodile tears"); they are a familiar feminine weapon used to achieve aims otherwise unattainable ("The world's greatest water power is woman's tears," said J. Kenfield Morley): these and other secondary misuses have not escaped attention.

In the framework of the big question mark called "crying," one subdivision stands out, if only because of its paradoxical character: tears of happiness. If tears are grief's "silent language," how can they be at the same time positive proof of "excess of joy"? If, as we are informed in Ecclesiastes (III, 4), there is "a time to weep and a time to laugh," how can there be a mixture of the two emotions? Are laughter and weeping interchangeable? Are extremes and opposites identical?

It should be stated, to begin with, that a happy event (or even a conspicuously happy event calling for the comment, "I am overjoyed") does not enter the life of the individual as *deus ex machina*. It is preceded by long periods of dreary expectations, and long barren stretches when success is absent from the circumscribed area of activity. If this were not so, the reaction to the happy event would be mere complacency; an expected outcome has materialized.

Both dreary expectations and periods when success is not forthcoming unconsciously mobilize a good dose of psychic masochism within the afflicted person. Once psychic masochism — the pleasure-in-displeasure pattern—is activated, it cannot be dismissed without discharging its accumulated and "ready to jump" store of energy. If the outcome of the dreary expectation is a flat failure, the ensuing depression absorbs the masochistic discharge. But if, unexpectedly, the outcome is favorable, this outlet is eliminated, and a new deposition is inwardly sought and found. *Despite* the happy event, the beneficiary behaves as if he were bemoaning the suffering that *preceded* the fortunate result.

In inner reality, therefore, "tears of happiness" are:

1. Unconscious discharge of psychic masochism, prepared for the negative outcome;
2. Unconscious pleasure derived from masochistically tinged self-pity, repeating in inner review the suffering preceding the favorable outcome;
3. Conscious rationalization of a paradox: since the individual is not conscious of mechanisms 1 and 2, an explanation satisfying logical thinking must be constructed. The fact that even the logic is faulty can be disregarded.

Points 1 and 2 can be illustrated by an old gag. A passenger in a train moans audibly; his neighbor asks whether he is in pain and is informed that the afflicted one is suffering from terrible intestinal cramps. The good Samaritan offers some pills, which are accepted. Immediate relief follows the taking of the medicine. After a short time, the moaning and groaning is resumed. "Are you in pain again?"—"No, but I'm thinking of the pain I had *before*." . . . Substitute for the conscious irony of the witticism an unconscious technique, and the simile fits.

As previously stated, the period of dreary expectations and absence of success mobilizes, intrapsychically, an appropriate dose of psychic masochism, later discharged in the paradoxical reaction of "tears of happiness." This statement needs elaboration.

The problem hinges on evaluation of the true nature of the superego, the unconscious conscience. Psychoanalytic psychiatry, based on Freud's discovery of the *dynamic* unconscious, proved that conscious and unconscious conscience have but a badly fitting name in common. *Conscious* conscience is a set of conventional and necessary rules of right and wrong, specific for specific cultural orbits. These restricting rules make civilized life possible, and no civilized person has any grievances against them. *Unconscious* conscience (for which the language has no word, hence Freud's neologism—superego) is by no means a puritanical extension of the long arm of conscious conscience. It is torture for torture's sake. Admittedly, it is difficult to imagine that every human being harbors his own inner enemy within himself—an ogre self-created, to boot. At bottom, it is the undischarged aggression of the infant, rebounding against the ego. Still, this dreary statement corresponds to clinical facts. Development and function of this internal-infernal "torture-machine" (Mark Twain, "The Mysterious Stranger") has been described at length in my books, "The Superego" (Grune & Stratton, 1952) and "The Battle of Conscience" (Washington Institute of Medicine, 1948).

One of the most ingenious of the unconscious ego's counter-measures against the barrage of torture meted out by the superego, is *psychic masochism*. If we assume that the inner conscience is anti-hedonistic and invariably punitive, it is not at all surprising that the unconscious ego must, if it is to survive at all, somehow neutralize this torture on the conveyor belt. By "libidinizing" punishment, the ego derives unconscious pleasure from pain. Thus, what was intended as punishment ends as allure. And the only pleasure one can derive from displeasure is to make this displeasure into a pleasure.

Why should the dreary preamble to "tears of happiness" serve to mobilize a goodly dose of psychic masochism? The answer lies in one of the "rules of torture" governing the superego. Among other painful techniques of the inner conscience one is outstanding; the inner torturer holds the ego "personally responsible" for failure. This failure may have been caused or influenced by objective facts, or unhappy coincidences, all beyond the individual's responsibility; nevertheless, the ego is blamed by the cruel and inflexible inner conscience. It is as though the superego adhered to the child's megalomania in the period when he was bragging of his unlimited power. Later corrections are not taken into account.

This being the case, punishment is dictated. This punishment is shortchanged by the ego into psychic masochism. One mobilized, the psycho-economical aspect results in the necessity of discharging the accumulated "energy." The latter cannot simply be dismissed like a servant who is not needed for the moment.

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The psychology of crying is unclarified. Personally, I am inclined to believe that a theory told me by a writer (in analysis because of writer's block*) has some merit. This man, having grasped the theory of psychic masochism and infantile megalomania (autarchy), suggested that tears (a fluid) represent an *autarchic self-consolation:* they are self-produced and self-given. This peculiar identification of tears with "milk" becomes less abstruse if one remembers how frequently the body "says it with fluids": saliva, sweat, urine, secretion of intestinal glands, etc. Pursuing this trend of thought, tears represent a narcissistic negation of the external defeat, and a self-consolation in the form of a self-bestowed "gift." The primitiveness of this autarchic technique is not a valid objection: every infantile mechanism in normality and neurosis proves that.

251 CENTRAL PARK WEST.

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Auto Elaboration: An Adjuvant Technique in the Practice of Psychotherapy

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Approximately a half century has elapsed since Freud began to make intelligible the psychogenic origin of neurotic symptoms. Coincidentally his method of psychoanalysis based primarily on the use of the technique of free association has come to be almost universally accepted as the treatment of choice for most types of psychoneurosis. However, due to many practical considerations, this "treatment of choice" has not been found applicable for the treatment of the great masses of the population suffering from neurotic disorders.

It seems unnecessary to enumerate again these practical barriers to the general utilization of the orthodox Freudian therapeutic technique. Hyman, in a paper published in 1936, covered this phase very adequately. But to mention only one drawback, there is the economic barrier. Even in the pre-war, pre-inflationary era, an average course of analytic therapy would cost $5,000 to $6,000. Today $10,000 is a conservative estimate of the cost. It is obvious that this factor alone makes the orthodox Freudian technique available to a small, economically favored segment of the neurotic population. Moreover, even if in a Utopian society, the financial handicap could be overcome for all suitable patients, it would still be impossible to utilize generally orthodox techniques because they entail such an uneconomical expenditure of the therapist's available time. If we allow ourselves the certainly over-generous estimate of 7,000 qualified psychotherapists in this country, each doing individual psychotherapy to the extent of 48 hours a week, with an average weekly allotment of 3 hours to a patient, the maximum yearly patient load that could be maintained on theoretically adequate treatment would be 102,000 patients. If we consult the statistical studies of Lemkau et al.,[2] and Rowntree et al.[3] we find that a minimum of 1 million, and more probably, 5 million adults out of a total population of 140 million require definitive therapy for neurotic disorders. When we bear in mind that these figures do not even include the time that the nation's psychiatric personnel *must* spend on the inpatient and outpatient care of several million overt psychotics, epileptics, and oligophrenics, it becomes apparent that we must find ways of more efficiently utilizing the psychotherapist's time than orthodox Freudian analysis permits.

In practice we have attempted to do this by utilizing various short-cuts in the diverse forms of brief psychotherapy, hypnoanalysis, narcoanalysis, etc., as well as by resorting to group therapy and the supervised employment of auxiliary professional personnel such as psychiatric social workers and psychologists. In spite of all this a tremendous unsatisfied need for these services still remains.

A little over a year ago the author introduced a technique of "auto-elaboration" as an adjuvant implement to be used in the practice of analytically oriented psychotherapy. A year's experience with the use of this aid with private and clinic patients has demonstrated that it is a safe and efficient means of accelerating, extending and consolidating the beneficial effects of the psychotherapeutic process. Briefly, the technique is as follows: After the initial examination, history taking, and diagnostic workup is completed the patient is given the usual orientation as to the goals and methods of psychotherapy, and then instructed as to his role in "free association." He is scheduled for one or two hour-long office interview sessions a week, as may best suit his needs. Where the financial burden of therapy is a factor he is reassured by the explanation that once the treatment is under way, the frequency of office visits may be reduced to one session a week by dint of

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his diligence and cooperation in doing his "home-work," i.e. auto-elaboration, in the intervals between visits. Usually by the third office visit the patient is actually started on "free association" generally relating to dream material or other appropriate points of origin for delving into the subconscious. During the therapeutic "free-association" sessions the therapist makes handwritten notes which are as nearly as practical verbatim transcripts of the patient's productions, as well as the therapist's comments, instructions, and remarks. (It may be interpolated here that it has always been the author's custom to take extensive notes on the patient's productions in any therapeutic session.) As soon as the patient shows some understanding of, and some facility in carrying on "free-association" he is ready to fulfill his home-work assignments in auto-elaboration. He is given the therapist's notes of his earlier association sessions, and is requested to make two copies (preferably typewritten) of these notes in quiet, undisturbed surroundings at home. One copy is for the therapist, the other is retained by the patient as part of his autobiography. The patient is instructed to try to do his "home-work" in a relaxed, undistracted mood, as nearly as possible approximating the uninhibited state aimed at on the therapeutic couch. Thus, while he is engaged in the automatic mechanical activity of copying, other relevenat associated thoughts, recollections and emotions are permitted to come to the fore. He is requested to add these to the original association material. In order to distinguish between this secondary elaboration and the original productions, he is instructed to use a uniform system of marginal indentation—so that we can see at a glance which are "old" and which are "new" productions. At subsequent office visits, as much time as is needed is spent in reading, discussing and perhaps interpreting the added "elaboration" material. The rest of the therapeutic hour is used in continuing the regular couch association routine. In actual practice one or two office sessions a week are sufficient for the treatment of the moderately severe neurotic. He is asked to devote one to three hours at his "home work" for each office session. It is desirable to regularly schedule these "home work" hours just as he would have to set aside specific hours to make more frequent visits to the therapist's office. The patient is instructed to try to avoid thinking about his neurotic problems beyond the time spent in his office visits and that devoted to his "home work." However, when he finds himself unduly upset in intervening periods by acute neurotic tension states, he is told he can find release simply by reading and re-reading previously recorded sections of his "psycho-autobiography." When a substantial degree of clinical improvement has been achieved the patient's office visits may safely be reduced to one in two weeks, so long as he still spends several hours between visits on auto-elaboration.

The rest of this paper will be concerned with enumerating the therapeutic functions served by auto-elaboration, and by presenting some clinical material to illustrate the operation of these functions.

I. Ventilation:

Charen[1] in an excellent recent review writes:

> "Ventilation and aeration of unwholesome attitudes and reactions is essential to subsequent desensitization to memories by removal of the unpleasant emotional tone connected with them."

We feel that ventilation necessarily also includes the expression by the patient of his day-to-day frustrations, and with his accession of insight thru the therapeutic process, his understanding of why minor daily-life frustrations induce such exaggerated emotional responses. Certainly no psychiatrist of experience will deny the therapeutic value of a procedure that expands the amount of ventilation available to the patient, both quantitatively and qualitatively, in a controlled, orderly fashion. Auto-elaboration does just this. We can evaluate the quantitative extension of ventilation by this procedure by referring to clinical records.

Mrs. P. R., a 26 year old housewife, suffering from a hysterical psychoneurosis with gastric and cardiac conversion symptoms, episodic depressions, verbalized to the extent of approximately 600 words in 45 minutes narco-analytic nteriview on 6/1/50. Her auto-elaborated productions for this same session totaled approximately 5000 words (an 8 fold

increase). This patient is a highly intelligent high school graduate who verbalizes readily and fluently in discussing her thoughts and emotions. A further example is the case of Mrs. W. V., a 39 year old housewife with a severe hysterical disorder characterized by multiple hypochondriacal complaints, psychosomatic vaso-motor attacks, and episodes of anxiety, tremulousness and emotional instability. In a narco-analytic interview on 2/13/50 Mrs. V. verbalized to the extent of 575 words. Her productions on auto-elaboration for this same session totaled approximately 900 words (a 1½ fold expansion of productivity). This is perhaps the average amount of elaboration one may anticipate developing in the usual fairly accessible neurotic. However, as an extreme example of the amount of material that may be uncovered there is the case of G.V., a 24 year old youth suffering from a severe mixed psychoneurosis with anxiety, hypochondriacal and obsessive, compulsive features. His first exercise in auto-elaboration was based on a couch free association interview on 10/31/50 in which he verbalized to the extent of 750 words. His auto-elaboration to this material was 3700 words. He then spent 11 weeks elaborating on his second interview session, and in the process verbalized to the extent of 27,000 words, a 30 fold increase. It is especially noteworthy that none of our patients show any significant tendency to repeat themselves in their auto-elaboration, all this additional verbiage reflecting new emotionally charged amnestic material. It has been gratifying to note a significant amelioration of G.V.'s symptoms, during the past few months when auto-elaboration was under way, despite the fact that he had not been seen regularly for routine psychotherapy for at least 8 months.

In reviewing material brought to the surface by auto-elaboration we soon find that it may also differ qualitatively from the material developed by simple free association. This is particularly true where a patient's feelings of modesty inhibit the full expression of thoughts and emotions in the physical presence of the therapist. Patients invariably find it easier to express "taboo" thoughts or modes of expression in writing, even as compared with free association under narco-analysis. Illustrative of this is patient P. R. who, under narco-analysis, recalled an incident which occurred when she was 16 years old, and which was pertinent to her development of a phobia against riding in the subway. In the analytic session she described it in these words:

"After I graduated high school my father thought I was too young to go to work, so I went to secretarial school; I used to ride near the end of the train of the Seventh Avenue Subway; I guess that's where degenerates used to ride; once a blond man in his thirties with a royal blue suit stood opposite me (in the engineer's cubicle). He just stood there and winked at me; his pants were open; I was disgusted and walked away—frightened too."

In her elaboration this patient wrote:

"Couldn't very easily discuss degenerate with you. What actually occurred was that he opened his pants, took out his penis and waved it at me. I feel nauseous now, so you can readily imagine how I felt then. This didn't happen just once. It happened so many times that I was really afraid to come home from school by 7th Avenue Subway, and finally started using the Independent Line altho it took me a good deal longer to get to the station from school."

II. Suggestion:

It requires little thought to realize that whatever influences the therapist exerts on the patient by suggestion in the therapeutic session are magnified and intensified by the exercise of auto-elaboration. In the first place, in copying the thoughts, directions, comments, stimuli and other verbalizations, their effect and meaning must necessarily become more deeply impressed in the patient's mind, if only through the mechanism of repetition. Furthermore, the recording of the therapist's remarks actually extend his influence in a temporal sense, giving the patient additional support and guidance in periods of stress. They may well be compared to the support a patient would get from direct letter correspondence or telephone conversations. That the patient utilizes this sort of helpful relationship is illustrated in the frequency with which the patient addresses himself directly to the therapist in his written productions, often interpolating remarks about what he thinks would be the therapist's opinion, judgment or emotional reaction about what he has written.

III. Release of Repression and Combatting Neurotic Tendency to Re-repression.

Our experience has shown that auto-elaboration facilitates and expedites the release of emotionally charged repressed material. As a example we may again turn to the case of W.V. mentioned previously. This woman under narco-analysis had readily disclosed details of incestuous attacks by her alcoholic father during her early adoles-

cence, resulting in her commitment to a child-care institution. She was sent from the institution to a foster home, where Mr. B., the head of the household, an influential and eminently respectable member of the community, repeatedly indulged himself sexually with her despite her fears and protests. When she complained to Mrs. B. she was denounced as a liar and recommitted to the institution. Soon after she was again released to a foster home, this time to the family of Mrs. S., where for a time she was relatively happy, and in her early therapeutic sessions she never disclosed any traumatic experiences in this household. However, on auto-elaboration the following incidents were revealed:

"I was put to board with a Mrs. S. She had two daughters. She was separated from her husband, but he would come to visit her all the time—he, too, raped me; he was a big, rough Irishman, who drank like a fish. When this happened I was crying and very hurt. When Mrs. S. asked me what was the matter I didn't tell her, as I well remembered the experience I had with Mrs. B. when I wasn't believed, and sent back to the home. So every time Mr. S. would get drunk I was in for a very rough time. It seemed to me that some one that didn't have a mother or father had to take all the abuse in the world. Each time that he would have anything to do with me I remember being so very sore that when I would urinate it would burn like fire, and I would cry, but would never let Mrs. S. see me as I was afraid."

Subsequent questioning disclosed that these incidents of her being "raped" by Mr. S. recurred regularly at two week intervals over a year-long period, and that he was otherwise kind to her, buying her presents, clothing, etc., even to the point of arousing the jealousy and protests of his own daughters.

Thompson[5] raises the point that in narco-analysis the patient's "permanent improvement depends to a great extent on the ability to keep from re-repressing" traumatic material. In our own experience it seems that re-repression, at least to the point of forgetting traumatic material, rarely if ever occurs. However, neurotic individuals characteristically tend to avoid thinking about, or reviewing their uncovered traumatic experiences, and to repeatedly seek other neurotic compromises to assuage the anxieties engendered by their reluctance to do this. Evidently, the exercise of auto-elaboration, with the repeated re-reading of traumatic material is a potent means of contraverting this tendency, as well as an eective method of desensitization.

IV. Abreaction:

Abreaction may be defined as the release of emotional tension by the revival of particularly traumatic memories in a setting in which the strong emotions and their somatic concomitants engendered by the original experience, are fully revived along with the recollection of the experience. It is usually most readily achieved by the use of such psychotherapeutic methods as hypno-analysis, narco-analysis and (we have been informed lately) by carbon dioxide therapy. Our clinical material shows that it also frequently occurs in the exercise of auto-elaboration. For example, P. R. in her elaboration was discussing conflicts with her husband and remarks as follows:

"I still get so nervous when I think of these things that I get the shakes. I can just feel my insides working and I feel so frustrated right now that I'll probably be quite disagreeable until I stop thinking about it. You once asked me if I ever perspire to excess. I think that I ought to mention that at this moment I'm in what is generally termed a "cold sweat."

On another occasion in describing her feelings about her family physician, who had become a very closely identified father-surrogate after her father's death, she writes:

"Even when I think about him something happens. I get nervous I think because my heart starts to pound very badly, and I can't quite get my breath."

V. Confession:

That confession is good for the soul is an axiom which the church has used traditionally to afford emotional release. It serves a psychotherapeutic function whether it is directed towards a priest or physician. Material of a "confessional" nature does appear in the course of auto-elaboration, as illustrated by the following examples:

C.K., a 28 year old male of superior intelligence suffering from a chronic recurring depression with anxiety features, has been seen for several months on a weekly basis in the clinic for routine psychotherapy. Despite the manifest presence of per-

sonality attributes which would justify the assumption of his being at least a "latent" homosexual, he vehemently denied ever feeling any type of sexual interest. He became hostile and indignant when the possibility that psycho-sexual conflicts was a factor in the genesis of his emotional disturbance was raised. Nevertheless in his fourth exercise in auto-elaboration he wrote the following:

"I find, much to my alarm, that I have a very appreciative eye for a young, handsome man. There is a certain exciting emotion that I feel when I see some one I think is particularly attractive. I do not connect this feeling with any sex emotion that I have ever known. I have a cousin, Eugene, who is some eight years my senior. I have never told Dr. M. about this because I have always been ashamed to talk about it and always thought I had put it out of my mind. I remember one night that Eugene was visiting our home and was sharing my room with me. I had always admired him because of his handsomeness and beautiful physique. One night, after he had been drinking a good deal, he came into my bed and began to fondle and caress me. I remember that I enjoyed this very much and had no idea of any sex emotion. (I believe I was about 15.) He became sexually aroused and literally forced me into a homosexual act. He committed sodomy and held his hand over my mouth so that I would not cry out. I remember that I was in great pain and frightened. He bit at my shoulders and made weird noises. He said filthy things to me as to what lengths his sexual desires could go. He then forced me into mutual fellatio and I was afraid of suffocating. After releasing me he threatened to tell my mother that I had been the aggressor if I said anything about it. He repeated his perverse acts again in the morning, and I submitted out of sheer terror. He would visit at our home about once every two weeks, or more often, and would force me into some sort of relationship with him. When I was about 17 he married and came less often and later not at all. I have not seen him in some 10 years. I have never had any other sexual relation and this I hated. It was filthy and bestial. I have always thought of sexual acts as being animal-like."

As an additional example we turn to the productions of W.V. in which we find the following:

"When I first ran away from home I got mixed up with a girl, if you can call her that. She was about 29 or 30 years old; she was living with a man who worked in a garage as car washer; as he worked nights she used to go out a lot and of course I was with her. I was very young. I don't quite remember if I was 14 or 15 years old. I might even have been younger. They had very little money, and I'm sure Adeline made money on the side. She started taking me out and we got mixed up with a bunch of petty gangsters; this happened in Brooklyn. The one I will never forget was called Spider M——. We were drinking at this party and he kissed me; when he did he put his tongue in my mouth. I bit it—he gave me some beating. If it wasn't for some other petty crook who was there he might have killed me. Adeline told me that she and Eddie couldn't support me, so I would have to pay my way, and why couldn't I be nice to the boys. I was, from one to another. I remember two in particular. Gus the Greek coffeepot owner; he took all my clothes and locked me in so I couldn't go out. When I finally got a chance I ran away. I was sorry later and wanted to go back, but he wouldn't have me after he found out all the men I had been with. He at least was gentle, as big as he was, and not adegenerate like old man Jess. Adeline introduced me to him; he ran a rooming house, and when Adeline left Eddie he took us in rent free, if I would be nice to him. So I was nice to him. It was a sickening experience. After a few weeks or months that seemed like years, Adeline made up with Eddie; we went to live with him. One night Eddie, Adeline and a friend of Eddie's and myself, went out to some Italian cafe. It was down in a cellar. We had spaghetti, wine and were dancing to an old-fashioned victrola. We were the only ones in the place; it was late; the doors were locked. I heard some one say in Italian something that sounded like 'Madre de Dios' and bang on the door. I hollered 'open the door.' I still don't know if I opened it, or if someone else did. A man came running in screaming 'help me, help me.' With that three other men ran in, grabbed him, threw him to the floor; with that I saw the flash of steel, they kept stabbing and stabbing, and we could hear him moan; then they lifted him up and carried him out on the sidewalk;—they ran away—the proprietor locked the doors, hustled us to the kitchen, pushed us thru the back door, told us to keep our mouths shut. We had to climb a back fence to get out on the street. The next day we read in the paper that a man had been found stabbed to death on the sidewalk outside the cafe. I don't think I cried or showed any reaction at the time, but it is all so very clear to me now. I tremble when I think of it. Right after this I became pregnant with whom I do not know. Adeline took me to some real old doctor, I think his name was Dr. P——, he put a catheter in me and told me on no account to call another doctor; well the catheter came out and of course the baby too, but three hours later I started to get chills and fever. We called Dr. P. and he said he was too sick to come. I was getting worse so Adeline called him again and told him she was going to call an ambulance, which she did. The ambulance doctor tried to get me to go to the hospital, but Adeline had already warned me not to sign, as once they got me to the hospital they could arrest me. We told them that I fell down the stairs and had a miscarriage, but they didn't believe me. They treated me and then left. About 15 minutes later Dr. P. arrived, and when he heard about it he was very much frightened. Adeline certainly gave it to him. I'll never forget that as I was in terrific pain, and also so afraid of being arrested."

VI. Accession of Insight and Facilitation of Self-Criticism

Robert Burns in his poem "To a Louse" epitomized the universal human incapacity to see and judge ourselves objectively and realistically with these matchless lines:

> "Oh wad some power the giftie gie us
> To see ourselves as others see us!
> It would frae monie a blunder free us,
> An' foolish notion—"

That this human frailty is especially pronounced in the neurotically sick individual whose thoughts are so distorted by his emotions, is a fact so obvious that we need not take time to amplify it here. It must be equally obvious that in order to achieve a lasting favorable psychotherapeutic result, we must lead the patient to a realistic evaluation of himself and understanding of his motivations. Auto-elaboration certainly must be considered an effective tool for reaching this goal, since by its means, we are repeatedly leading the patient to confront himself as well as his neurotic fancies, fantasies, and foibles, in the mirror of his own productions. Our clinical material is replete with examples of this, but to avoid being redundant, we shall cite only one, some additional remarks culled from the writings of the homosexual patient, C.K. In concluding the exercise in which he described his homosexual experiences, he writes:

> "There are so many things I am beginning to realize about myself. . I realize that I have very strong homosexual tendencies. I have tried to convince myself that I haven't, but I know they are there, and I am rather alarmed as to what is going to happen to me. I have told myself that I didn't have any sexual desires. This is also not true. In my opinion I have always had the desire but something is in the way blocking the fulfillment of that desire."

While we have attempted to point out the advantage and usefulness of auto-elaboration there are certain limitations and contraindications. Primarily the patient must be literate and have a sufficiently high level of intelligence to be able to adequately follow the outlined procedure. Except for this, we feel it should be applicable whenever an analytically oriented type of psychotherapy may be used. We would hesitate to use it in any overt psychotic states, where any degree of probing into the subconscious might be hazardous.

Summary

Auto-elaboration is proposed as an adjuvant technique to be used in the practice of analytically oriented psychotherapy. It consist of taking, as nearly as possible, verbatim notes of the patient's and therapist's productions in the routine "free association" interview. After a suitable interval these notes are returned to the patient for transcribing in the form of a permanent record. While he is copying the notes he is told to add to or elaborate on them as much new association material as readily comes to mind. We thus eventually will have worked out a complete "psychoautobiography." During the process emotional release and desensitization is fostered by repeated re-readings of the associated and elaborated material.

This technique subserves the functions of ventilation, suggestion, release of repression, and prevention of re-repression, abreaction, confession, and accession of insight. Illustrations are given of its operation in promoting each of these functions.

We have found it to be a safe effective means of accelerating, extending, and consolidating the beneficial effects of the psychotherapeutic process. It becomes economically and chronologically feasible for qualified psychiatrists to satisfy the public's needs, by doubling or trebling their patient load.

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Neurological Clinical Pathological Conference of the Cincinnati General Hospital

CHARLES D. ARING, M.D., *Editor*

CASE NO. 270974

Presentation

A 68-year-old colored woman was admitted to the hospital on January 14 because of diminished responsiveness, high fever, and incontinence. Relatives said she had been able to get about until three weeks prior to admission at which time she developed recurrent vomiting of most of the food that she ingested. The vomitus was not bloody or coffee ground in character. She gradually became worse and was confined to bed. She retained some fluids and about one meal a day. One week prior to admission she had a clonic convulsion in which both arms were held flexed with the hands clenched. She bit her tongue. Three or four similar seizures occurred during the ensuing week. Her level of awareness gradually declined so that at the time of admission she was unresponsive. No history of chills or night sweats could be obtained from relatives. There had been no headache and no local weakness. She was a known hypertensive of several years' duration. Three or four years earlier she had suffered a "light stroke" from which she had largely recovered but relatives reported brief periods of disorientation and incoherence since the stroke.

On admission her rectal temperature was 105° F., the pulse rate 150, respirations 60, and blood pressure 120/50. The blood pressure rose gradually until it was 155/95 on February 9, 1951. She was obese. She responded to painful stimuli only. Her lungs were clear to percussion and auscultation. There was moderate abdominal distention with diffuse tenderness. Peristaltic sounds were of good quality. Neurologic examination was not considered to be remarkable except for the reduced state of consciousness.

Hemoglobin was 13 grams and the white count 21,250 with 75 per cent neutrophils. Blood urea nitrogen was 31 mg. per cent, CO_2 was 45, blood sugar 145. A lumbar puncture revealed a pressure of 80 mm., 15 lymphocytes, total protein of 125 mg. per cent, and the Wassermann reaction was 4 plus. Roentgen studies of the chest, abdomen (including barium swallow and enema), and skull failed to reveal abnormality. Urinalysis was normal save for a 3 plus albumin. Blood Wassermann reaction was negative as was a quantitative Kahn test.

She was treated symptomatically by hydration, penicillin (200,000 units), and aureomycin (0.5 Gm.) every six hours. Her level of consciousness seemed to improve somewhat, when it was noted that she tended to keep her head and eyes turned to the left and that her lower extremities were quite spastic. There was a strong sucking reflex, forced grasping bilaterally, and a questionable right lower facial weakness. Deep reflexes were impossible to evaluate because of the spasticity and her resistance. Plantar responses were flexor bilaterally.

The temperature fell to 101 degrees. She seemed more alert, and on January 16 she was able to recognize visitors and call them by name. Lumbar puncture was repeated on this date. The cerebrospinal fluid contained 15 lymphocytes per cmm. and 103 mg. per cent of protein; other findings were not recorded. Cultures were made of sputum, urine, stool, and blood, but none grew organisms other than a few colonies of aerobacter aerogenes from the urine. Extensive roentgen examinations including choleocystograms, intravenous pyelograms, and gastrointestinal series failed to aid in the explanation of the febrile state.

Antibiotics were discontinued on January 30 after 11.2 million units of penicillin and 26 grams of aureomycin had been administered, since the temperature had continued to range between 100 and 102 degrees, at times spiking as high as 103 despite them. On February 3 her lethargy increased. She was showing emotional lability with facial grimacing and she spoke almost entirely in nonsensical fashion. There seemed to be a gross tremor of the jaw and the arms. Examination at that time revealed pupils that reacted to light and on convergence, mild spasticity of both upper extremities, and symmetrically hypoactive deep reflexes. On February 4 she had a period of unresponsiveness, following which EKG changes consistent with posterior myocardial infarction were obtained. Accordingly, she was placed on a coronary regime. At this time she was started on terramycin without altering the febrile course of her illness after 4 days and 8 grams of it.

A neurological examination on February 10 revealed the patient to be lying with her thighs flexed and the upper extremities tending to assume flexed attitudes. She was perspiring profusely. She was unable to cooperate and repeatedly said nothing but "Oh" throughout the examination, increasing or decreasing in intensity, depending upon how much she was disturbed by the examiner. She resisted in a negativistic fashion the opening of the eyes, movements of the head, or the upper extremities. The lower extremities seemed too weak to resist. She exclaimed loudly when they were moved. The pupils were 2 mm. in diameter and reacted to light. Pin prick evoked little or no movement of the toes and feet. She appeared to appreciate pin prick everywhere. There were grasp reflexes bilaterally but no snout response or jaw jerk. Deep reflexes

were difficult to elicit. There was little response to plantar stimulation; it was thought that response to deep plantar stroke on the left tended to be extensor. Lumbar puncture on February 3 revealed an initial pressure of 130 mm.; the fluid contained 7 lymphocytes and 116 red cells per cmm., 61 mg. per cent of protein, a gold curve of 5543321000, and a 4 plus Wassermann reaction.

The patient continued the spiking temperature, became generally worse, and developed decubiti. Despite much therapy she went steadily downhill and died on February 16.

Differential Diagnosis

Dr. Harry M. Salzer: In approaching this case I thought perhaps I had been given a present because the Wassermann was so delightfully positive. On the other hand, having discussed from this platform a case of dementia paralytica with negative cerebrospinal fluid Wassermann (the diagnosis proven by microscopic findings), I feel that one should beware of Greeks bearing gifts.

The patient's symptoms began about three weeks before hospital admission. At that time because of the fever, the diminished responsiveness, and incontinence one might believe that she had some inflammatory process. I think that is all one can say about the initial symptoms. The fact that she had clonic convulsions a week prior to admission is of minor help and merely indicates diffuse cerebral change; they were not localized and would not implicate one hemisphere more than another. She had similar seizures in the ensuing week.

The patient was known to have had hypertension and yet on admission the blood pressure was only 120/50. One wonders what reduced the blood pressure. Could the drop have been associated with infection or might she have had some cardiac catastrophy in the meantime? The stroke which she suffered some three or four years earlier was of no help in localization because there was no record of which side was involved. According to the relatives she had periods of disorientation and incoherence; one might infer, were she right handed, involvement of the left cerebral hemisphere. Hand dominance would have to be known for that to be of any localizing help.

The white count on admission indicated an inflammatory process. The blood pressure may have dropped because of a coronary attack, the elevated white count too could be from that. On the other hand, she might have had some infectious process other than syphilis to give her the raised count. Apparently she was dehydrated but we do not know the red count. The increased white count may have merely represented hemoconcentration, and the red count may have been elevated as well.

The cerebrospinal fluid was significant in that the protein was elevated to 125 mg. and the Wassermann was reported as 4 plus. Apparently many roentgen studies were done because the patient had been vomiting, but the complete review and also skull films failed to reveal any abnormality. The blood serology was reported as negative.

With treatment the patient seemed to improve, and then the localization that we were looking for was suggested. The patient tended to keep the head and eyes turned to the left, and there was a questionable right facial weakness. Both of these findings suggested a left cerebral paralytic lesion involving a head and eye turning area, the right facial weakness corroborating this localization. The sucking reflex and forced grasping merely indicated release of cerebral inhibition and were not localizing. The flexor plantar responses were against involvement of the pyramidal tract. The patient improved enough to recognize visitors and call them by name. One would think the temporal lobe had been spared to some extent because of her ability to do that.

The second lumbar puncture revealed 15 lymphocytes and a protein of 103 mg. per cent in the cerebrospinal fluid. I do not know why other findings such as Wassermann and gold curve were not recorded; they would have been of assistance.

Improvement was not maintained, and I feel that failure to continue penicillin was a mistake in therapy. In view of the maintained fever, treatment should have been continued even though she had had 11,000,000 units of penicillin and aureomycin as well. Thereafter the symptoms were indicative of diffuse cerebral change: she was lethargic, emotionally labile, grimaced, spoke nonsensically, and showed gross tremor of the jaw and arms, and spasticity.

Pupils that react to light are unusual in

paresis, but pupils may be normal in paresis. The posterior myocardial infarction was an added episode which had no bearing on the neurological problem.

Examination on February 10 again indicated diffuse cerebral change. The resistance to movements of the head might have indicated some meningeal reaction, but it must have been negligible with the few cells reported in the cerebrospinal fluid. On the later examinations, the left plantar response tended to be extensor; findings previously suggested left cerebral involvement. The final cerebrospinal fluid specimen showed a first zone gold curve and the protein had dropped considerably, but the patient had had antibiotic treatment over a period of a few weeks. Again the cerebrospinal fluid Wassermann was strongly positive.

With what sort of lesion might we be dealing in this case? Because of the cerebrospinal fluid findings we must consider dementia paralytica even though the patient was 68 years of age. Whereas most paresis occurs 20 to 25 years earlier, it may occur at a late age, particularly if lues was contracted late in life. Other types of neurosyphilis might be considered. Acute luetic meningitis usually occurs within the first two years after contraction of lues. Occasionally in vascular neurosyphilis convulsions may occur as one of the initial symptoms. In gumma usually there are signs of an expanding lesion.

A type of paresis occurring at this age is senile paretic neurosyphilis, differentiated because the pathological picture is complicated by diffuse or focal luetic brain damage combined with the effects of cerebral arteriosclerosis. There is another type known as Lissauer's paresis. In the series described by Merritt, Adams and Solomon[1] the oldest patient was 63 years. They noted the average age in the Lissauer type as 44 years. So our patient was past the average, but the case would not be considered in this conference were it average. Some 80 per cent of patients with Lissauer's dementia paralytica have had hemiplegia, approximately 82 per cent have had seizures, and about 55 per cent have had aphasia; some evidence of those symptoms occurred in our patient.

The duration of the Lissauer form is about 7 years. This patient had some difficulty occurring 3 or 4 years previously, again consistent with the Lissauer type which seems to progress more slowly than ordinary paresis. One should consider Lissauer's paretic neurosyphilis when there are apoplectiform or epileptiform attacks followed by hemiplegia, hemianopia, and aphasia. We know nothing about the patient's visual fields, but one suspects she had aphasia at one time or another and perhaps hemiplegia. The difference between Lissauer's type and usual paresis is quantitative rather than qualitative; atrophy in Lissauer's is frequently temporal and inferior parietal.

There are a few conditions yet to be mentioned for completeness. A cardiac disorder associated with cerebral change may have been operative; there was electrocardiographic abnormality, and she may have had an embolus or multiple emboli. There was no history of cardiac irregularity. I believe embolism unlikely.

Meningeal carcinomatosis or another type of metastatic carcinoma is unlikely, but deserves mention. Chest and other roentgen films were normal.

Primary cerebral tumor is as unlikely as cerebral abscess. In these one would expect elevated cerebrospinal fluid pressure, more definite localizing signs, and not the rapid mental deterioration that followed the seizures.

My final diagnosis is dementia paralytica, perhaps of the Lissauer type, or possibly a senile type. It is likely that she had cerebral arteriosclerosis combined with whatever other process was going on.

In closing I would like to quote from Sir Heneage Ogilvie[2] who said, "Remember that experience is never finished and wisdom is never complete; that we are always more likely to meet the common than the unusual, but that what appears at first to be a simple and familiar clinical problem may yet be something that we have never met, even something hitherto unrecorded; that no problem is so straightforward that it does not need careful study, or so difficult that some solution will not appear if we seek steadfastly." In the analysis of this case I have leaned toward the commoner disorders

of the central nervous system, a technique which usually brings one home safely.

Dr. Charles D. Aring: Dr. Trufant and I examined this patient thoroughly on February 10. You will recall that she had been admitted on January 14. We had become uneasy about the persistently febrile course and mental signs despite the use of quite liberal amounts of penicillin. I will read the note about our examination because I think it describes her state clearly and you'll get some idea of the clinical picture.

We saw her lying on her right side with her legs and thighs flexed at 90 degree angles and her upper extremities tending to assume flexed attitudes. She was perspiring profusely, the pillow was wet because of it. She could not cooperate. She vocalized "oh" throughout our examination, increasing and decreasing the intensity of it, depending on whether or not the examination disturbed her. The pupils were 2 mm. in diameter and reacted promptly. She negativistically resisted passive opening of the eyes. She also resisted movements of the head and upper extremities; the lower extremities seemed too weak to resist. She exclaimed loudly when they were passively moved. We didn't know whether this was contracture, the limbs having been allowed to assume fixed attitudes, and when we passively moved them, this caused her a great deal of pain and therefore she exclaimed. We saw no obvious signs of cranial nerve disturbance in a "veterinarian" examination. She resisted actively or reflexly any passive movement of the upper limbs; these maneuvers evoked the "oh" louder and longer. This resistance was extremely powerful throughout the range of extension and flexion. Pinprick evoked little movement of the toes and feet. She seemingly had a paraplegia. Tone in the lowers was not as powerful as that in the uppers. She grasped when the palms were relatively lightly stimulated and did not relax this grasp very much even when the stimulus was lightened, although it was possible eventually to slip the stimulating object (throat stick) out of the hand laterally. We got no snout response, no jaw jerk. She appeared to appreciate pinprick everywhere. Deep reflexes were difficult to elicit; we got flickers of the quadriceps bilaterally. We could not get ankle jerks. There was little response besides increased vocalization to plantar stimulation. We thought that the left plantar response tended to be weakly extensor on occasions.

In conclusion we believed that the story of stroke some 6 or 7 years ago was evidence for cerebrovascular disease, as was the very active neurosyphilis. We suspected that she had dementia paralytica as well as Heubner's endarteritis. We postulated that we were dealing with an end stage of extensive bilateral frontal lobe degeneration. Of course we wondered about the paraplegia, whether or not she had a spinal cord lesion, but we were inclined to feel that the cerebral degeneration was enough to account for the weak and spastic limbs. We said that she seemed to have had the requisite dose of penicillin to halt an active central nervous system syphilitic process, and it was postulated that her clinical state, resembling somewhat that of decerebration, was the result of cortical damage which nothing could alleviate.

Student: What was the cell count in the cerebrospinal fluid?

Dr. Aring: Never higher than 15 lymphocytes per cmm.

Student: Isn't that rather low?

Dr. Aring: You can't use the cerebrospinal fluid as you do a slide rule. In the first place you've invested the person doing the count with reliability, and I have found that to be a rather unsatisfactory business. Secondly, having done a lot of cerebrospinal fluid counts myself, I know that one has to take extreme care, count the fluid when it is fresh and after staining the cells. I myself can't differentiate cells unless they are stained. Besides, I don't think we can closely judge a luetic process by the cell count; 15 cells per cmm. is as much indicative of abnormality as, let's say 100.

Student: What explanation do you have for the fever?

Dr. Aring: Most of you are too young to remember what happened to patients with dementia paralytica several decades ago. They all had fever and became emaciated. They developed contractures and finally died in an emaciated, febrile state. Why that occurred, I don't think we know unless we

want to postulate that there was some involvement of the centers controlling temperature and nutrition. Now it is rare that we ever see patients dying from dementia paralytica alone.

Discussion of Pathology

Dr. Murton Shaver: The autopsy was performed 4 hours postmortem. The general findings included the following: coronary arteriosclerosis with thrombosis and recent and old infarctions with myocardial fibrosis. The cause of death was attributed to a recent infarct in the myocardium. There were scattered infarcts, some of them were old, in the lung and spleen. There was inactive syphilitic aortitis, chronic cystitis and pyelonephritis, and a terminal acute bronchitis and lobular pneumonia.

The brain weighed 900 grams. There was some widening of the sulci generally over the entire brain, and the leptomeninges were thickened and of a slight bluish grey color. There was some grayish white exudate in some widened sulci in the parisagittal region. It was felt that there might have been some superficial softening of the cortex to palpation in some areas. On the inferior surfaces the leptomeninges were not so markedly thickened. Beneath the pons and medulla they were thickened and had this bluish grey color, a rather metallic appearance.

Vertical sections showed the tissue to be rather firm generally to palpation. The ventricles were enlarged with no displacement of the midline structures. The ependymal surface appeared smooth throughout the ventricles; there was no gross evidence of granular ependymitis. There were scattered areas of grey discoloration in the white matter lying just beneath the cortex, somewhat similar to those in disseminated sclerosis. These have been described in luetic disorders of the central nervous system. There was arteriosclerosis of the intrinsic vessels.

Multiple sections taken from the cerebral cortex examined microscopically revealed diffuse thickening of leptomeninges with collagen fibers, while there was patchy infiltration by mononuclear inflammatory cells, a few of which were plasma cells and the remainder mostly lymphocytes. These were found infiltrating the adventitia of some of the vessels of the leptomeninges as well as in the leptomeninges and in the deeper sulci. A few of the vessels showed endothelial proliferation with diminution of the size of the vessel lumen, and occasional vessels were occluded by organized and hyalinized thrombi.

The cortex generally showed patchy loss of nerve cells although the cytoarchitecture was fairly well preserved in some areas, and there was no diffuse increase in cellularity. In patchy areas there was marked increase in the number of capillaries, many of which were hyalinized and their walls thickened. In other areas there were large numbers of budding capillaries extending down from the pia into the superficial cortex. There was a diffuse slight increase in astrocytes in the outer layers of the cortex and in patchy areas the nerve cells were completely lost. There were large numbers of histiocytes in some of these areas. In other areas there were numbers of gemistocytic or piloid astrocytes infiltrating the degenerated tissue around cerebral or meningeal vessels.

In the deeper layers of the cortex and in the white matter, some of the vessels were ringed by collars of monocytes similar to those found in the leptomeninges and in a few areas these extended into the surrounding tissue, and in many cases the adjacent tissue showed rarefaction. The Loyez stain showed demyelination in these areas as well as in the areas of destruction described in the cortex. Special iron stains failed to demonstrate the presence of iron in the endothelial cells. The ependyma of the lateral and third ventricles was normal.

Sections through the pons and adjacent cerebellar peduncles and cerebellum showed thickening and cellular infiltration into the basal leptomeninges similar to that described over the surface of the cerebrum. Here again there were extensions of inflammatory cells along some of the meningeal vessels into the pons and patchy areas of perivascular rarefaction, some of which contained a few histiocytes while others were infiltrated by numbers of astrocytes. There was patchy loss of nerve cells generally, but no generalized increase in endothelial cells. The ependyma of the fourth ventricle showed one or

two slightly raised areas near the midline suggestive of early granular ependymitis, but no definite ependymitis was present. Specific stains of these sections again failed to demonstrate the presence of iron in endothelial cells, while myelin stains showed myelin destruction in the perivascular areas similar to that described in previous sections.

Sections of the medulla and spinal cord revealed leptomeningeal thickening with collagen and focal areas of infiltration by mononuclear cells including a few plasma cells. In some of these areas there was marked thickening of meningeal vessels, the adventitia being infiltrated by monocytic inflammatory cells, while there was marked thickening also of the endothelium and narrowing of the lumen. Some of the vessels were occluded by thrombi. Scattered vessels throughout the medulla and cord were ringed by similar inflammatory cells and there were patchy areas of parenchymal degeneration surrounding some of these vessels. No selective degeneration was noted in the posterior columns of white matter, and generally large numbers of the anterior horn cells and Clarke's column cells were well preserved. The anterior horn cells appeared to be markedly diminished in sections through the lumbar region, where there was some diffuse infiltration by glial cells, but no proliferation of the endothelial cells and no iron was demonstrated.

Clinical Diagnosis

Dementia paralytica.
Myocardial infarction.
Chronic pyelonephritis.
Generalized arteriosclerosis.
Essential hypertension.
Decubitus ulcer, extensive.

Dr. Salzer's Diagnosis

Dementia paralytica.
Cerebral arteriosclerosis.

Anatomical Diagnosis

Meningovascular syphilis, disseminated in brain and spinal cord.

Cerebral arteriosclerosis.

Coronary arteriosclerosis with recent thrombosis and recent and old myocardial infarctions.

Syphilitic aortitis, inactive.
Chronic cystitis and pyelonephritis.
Old and recent pulmonary emboli.
Lobular pneumonia.

Dr. Aring: There seems to have been hyalinization of capillaries and arterioles which some look upon as rather characteristic of hypertension, or so it is when found without the nervous system.

Dr. Shaver: It has been described in the nervous system in meningovascular lues in the late stages, also in toxic states. It has been claimed that some 20 per cent of general paretics diagnosed clinically turn out to have this form of encephalitis.

Dr. Aring: That is, an admixture of meningovascular and parenchymatous neurosyphilis.

Dr. Shaver: Well, yes, as an extension from the vascular site. Specific stains in this case failed to demonstrate the presence of iron in the endothelial cells.

Dr. Aring: We look for certain characteristics in brains of people who die with dementia paralytica, and Dr. Shaver indicated their absence as he went along; perhaps most characteristic are the iron deposits around the vessels, which were not found in this case. The granular ependymitis which we expect almost universally in dementia paralytica is not present here; of course granular ependymitis occurs in other disorders, particularly in the meningitides. The outfall of ganglion cells in the cortex was not striking except as Dr. Shaver demonstrated around small vessels. That is, this case had a streak-like destruction of bits of the cerebrum, not the spotty outfall of cortical cells that one expects to see. Neither did Dr. Shaver demonstrate the hypertrophied microglia (rod cells) or the increase in glia in the cortex, so typically found in dementia paralytica. What he showed was essentially a vascular type of neurosyphilic with meningeal involvement.

Dr. Salzer: I'd like to ask Dr. Shaver if he thinks the penicillin therapy altered the picture here?

Dr. Shaver: It very definitely could have.

Student: What were the findings in the kidney on autopsy?

Dr. Shaver: Chronic pyelitis with inflammatory reaction extending into the medul-

lary papillae; focal scarring of slight chronic pyelonephritis, arterio and arteriolar sclerosis; some tubules contained neutrophils; toxic granularity and swelling of the convoluted tubules, and an organized thrombus within a renal vein.

Dr. Salzer: From the standpoint of therapy, I would like to suggest that the penicillin should have been continued. The patient had shown improvement after a couple weeks of penicillin. I have recently had a patient who had 2 years of penicillin treatment. He had a positive Wassermann and a first-zone gold curve. His left pupil was fixed to light. He had a positive Romberg test and a very disturbed gait because of a left hemiparesis. Penicillin was not discontinued through error. Anyway, he did receive almost 2 years of penicillin therapy. The left pupil became active, the right which had been parodoxical became fixed to light. The Romberg was just about negative and the gait was near normal. The cerebrospinal fluid Wassermann became negative and the gold curve too. This experience might alter our concept of how much penicillin is necessary in the treatment of a severe case of neurosyphilis.

Dr. Aring: We are still learning about proper therapeutic dosage of the antibiotics in neurosyphilis. The usual statement is that some 5 to 15 million units are quite adequate, but if this does not relieve the clinical picture and reverse the abnormal cerebrospinal fluid, then subsequent courses should be given.

Dr. J. Park Biehl: The serology is usually very slow in reversing. It usually takes a matter of years. Abnormal cellular and protein content respond promptly.

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   Lennox, W.G. and Cobb, S.: Ind. Med. *11*: 571, 1942.
3. *the performance* of employed epileptics does not deviate from that of normals with respect to absenteeism or frequency rate of injuries.
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4. *of the unemployed,* "68% given careful medical and psychological study can be expected to be restored to employment."
   Staff Dev. Aids No. 4, Fed. Security Agcy., Office Vocational Rehabilitation, Wash., D.C., 1948.

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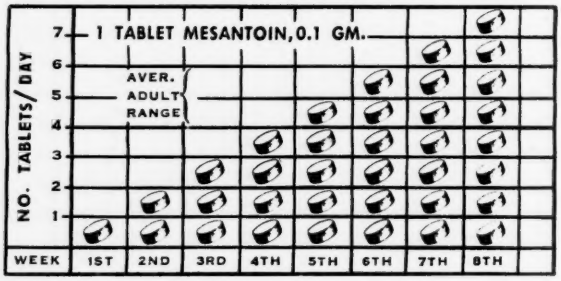

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